

AD-777 671

SUBJECTIVE EVALUATION OF A BRITISH WIDE
VISION FACE MASK WITH A "WATER SEAL"

C. W. Stephens, et al

Navy Experimental Diving Unit
Washington, D. C.

14 April 1960

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AD-777671

DOCUMENT CONTROL DATA - R & D		
<i>(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)</i>		
1. ORIGINATING ACTIVITY (Corporate author) Officer in Charge Navy Experimental Diving Unit Washington Navy Yard, Wash., D.C. 20374		20. REPORT SECURITY CLASSIFICATION UNCLASSIFIED
		25. GROUP
3. REPORT TITLE SUBJECTIVE EVALUATION OF A BRITISH WIDE VISION FACE MASK WITH A "WATER SEAL"		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Final		
5. AUTHOR(S) (First name, middle initial, last name) G. M. Janney		
6. REPORT DATE 14 April 1960	7a. TOTAL NO. OF PAGES 10	7b. NO. OF REFS 2
8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S) EVALUATION REPORT 15-60	
b. PROJECT NO. NS 166-200	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
c.		
d.		
10. DISTRIBUTION STATEMENT Approved for public release; distribution unlimited		
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY Navy Experimental Diving Unit Washington Navy Yard Washington, D. C. 20374
13. ABSTRACT A British "Wide Vision Face Mask" was given a subjective evaluation. The optical characteristics of the face-piece and the location of the mouthpiece were found to be unsatisfactory. The water seal was found to be superior to other types of face mask seal.		

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U S Department of Commerce
Springfield VA 22151

UNCLASSIFIED

Security Classification

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Scuba Equipment Engineering						

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NAVY EXPERIMENTAL DIVING UNIT
BLDG. 214, WASHINGTON NAVY YARD
WASHINGTON, D.C. 20374

EVALUATION REPORT 15-60

SUBJECTIVE EVALUATION OF A BRITISH WIDE
VISION FACE MASK WITH A "WATER SEAL"

PROJECT NS 186-200 SUBTASK 4 TEST 53

14 April 1960

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SUMMARY

PROBLEM:

To evaluate the British "Wide Vision Face Mask" to determine if it or any of its features are suitable for use in the U. S. Navy.

FINDINGS:

- (1) The facepiece produces distortion of the side vision.
- (2) The location and configuration of the mouthpiece is unsatisfactory.
- (3) The water seal is comfortable, fits a wide range of facial contours, and provides a very effective seal. It is superior to types of face mask seals previously evaluated.
- (4) The other features of the mask, such as the harness and general construction, are comparable to masks currently in use in the U. S. Navy.

RECOMMENDATIONS:

- (1) The British Wide Vision Face Mask should not be adopted for use in the U. S. Navy.
- (2) The water seal should be given consideration in future mask designs.

ADMINISTRATIVE INFORMATION

Ref: (a) BuShips ltr Ser 638-416 of 13 April 1959
(b) Telecon between Mr. M.J. Foran (BuShips-Code 638)
and LTJG G. M. Janney (EDU) on 20 April 1959

Reference (a) forwarded on British Wide Vision Face Mask and requested the Experimental Diving Unit (and Explosive Ordnance Disposal Training Center) to conduct a functional evaluation of the mask. The purpose of the evaluation was "to establish U. S. Navy requirements for a mask of this design or to establish features which would be adaptable for inclusion in such a mask." The mask was produced by the Chemical Defense Experimental Establishment and was made available to the U. S. Navy under the terms of the Information Exchange Project on Undersea Warfare.

Reference (b) assigned project number NS 186-200 Subtask 4 Test 53 to the evaluation of the mask. C. W. Stephens, BMC (DV), U.S. Navy was designated Assistant Project Engineer for this project. Work began in September 1959 and was completed in October 1959. The following breakdown indicates the man-hours expended for this project:

<u>DESCRIPTION</u>	<u>MAN-HOURS</u>
Pool testing	8
Tank testing	24
Report preparation	6
Clerical	4
TOTAL	42

This is the first report under this project number. Charges incurred in the execution of this project were lodged against Allotment 70102/60. This report is issued in the Experimental Diving Unit Evaluation Report Series and is distributed only to the Bureau of Ships.

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1. INTRODUCTION

1.1 Background

1.1.1 One Wide Vision Face Mask of British manufacture was forwarded to the Experimental Diving Unit for evaluation. The mask is of interest primarily because of the water seal which may provide an advantage in comfort and sealing characteristics for mixed gas diving, especially where prolonged submersions are required.

1.2 Objective

1.2.1 The objective of this evaluation is to determine whether the Wide Vision Face Mask or any of its features are suitable for use in the U. S. Navy.

1.3 Scope

1.3.1 The tests of the mask were restricted to subjective observations made on the basis of use of the mask in the swimming pool and the pressure tank.

2. DESCRIPTION

2.1 General

2.1.1 The British Wide Vision Face Mask is a full face mask, made of molded black rubber. The facepiece is made of plexiglass and is a "wrap around" type. As received, the mask had an oblong hole below the facepiece for installing a mouthpiece or an oral-nasal mask.

2.1.2 Around the inner periphery of the face mask is a hollow shaped tube, molded integrally with the mask. The tube is filled with water to provide sealing on a wide variety of facial contours. A filling tube extends approximately one-half inch from the outside of the mask below the chin on the left side of the mask. The filling tube contains a wooden plug and is wrapped with thread to maintain the seal.

2.1.3 The head harness is made of molded rubber with fabric reinforcement. The harness has six straps which attach to buckles mounted on the face mask. Each buckle has a releasing tab.

3. PROCEDURES AND RESULTS

3.1 Preliminary

3.1.1 A Northill Air Lung mouthpiece tee connector was connected to the corrugated mouthpiece tube and the mouthpiece was installed in the mask. The mask was then attached to a standard, open-circuit, scuba regulator.

3.2 Subjective Tests

3.2.1 Six subjects used the British Wide Vision Face Mask in the swimming pool with open-circuit scuba, observing its characteristics. The subjects then each made swims of one and one-half hours on the "trapeze" in the pressure tank. The swims were made against an eight pound force, with the subject resting when he desired. The depth of water was approximately four feet. A tender observed the mask during the swims to determine whether there was any air leakage out of the mask.

3.2.2 At the conclusion of the swims each subject submitted his comments on the mask. The following is a summary of the comments:

- a. The comfort of the mask was very good except for the mouthpiece which was not properly positioned.
- b. The fit was very good.
- c. The seal was very good; no leakage was observed by either the subject or his tender.
- d. The visibility was good except for distortion of the side vision.

4. DISCUSSION

4.1 General

4.1.1 The positioning of the mouthpiece was found to be poor and caused discomfort. This poor positioning is apparent immediately upon donning the mask. It appears that the mouthpiece has been mounted too low in order to increase the visibility.

4.1.2 The visibility provided by the mask is good in all directions, but distortion at the sides detracts from the advantage of wider vision.

4.2 Water seal

4.2.1 The water seal provided good fit, comfort and sealing properties for subjects having a wide range of facial types. The subjects said that the comfort of the mask was superior to any scuba mask previously used.

4.2.1 The durability and ruggedness of the water seal has not been determined. It is possible that the soft material used in the seal may not withstand the usage which would be given a scuba mask.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 The following conclusions apply to the British Wide Vision Face Mask:

- a. The facepiece produces distortion of the side vision.
- b. The location and configuration of the mouth-piece is unsatisfactory.
- c. The water seal is comfortable, fits a wide range of facial contours, and provides a very effective seal. It is superior to types of face mask seals previously evaluated.
- d. The other features of the mask, such as the the harness and general construction, are comparable to masks currently in use in the U. S. Navy.

5.2 Recommendations

5.2.1 It is recommended that the British Wide Vision Face Mask not be adopted for use in the U. S. Navy.

5.2.2 It is recommended that the water seal be given consideration in future mask design.